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Front cover: ANHM recipient Dr Simon Grove, with Nick Williams. Photo Joan Broadberry (see p. 25)
Back cover: Apostlebirds *Struthidea cinerea* perched in cypress pines. Photo Matthew Mo (see p. 19)

Nest boxes for wildlife in Victoria: an overview of nest box distribution and use

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Abstract
Nest boxes are deployed by individuals, community groups, researchers and government and non-government organisations, mainly to improve habitat for native hollow-dependent fauna. Information was sought from those involved in nest box programs to assess the distribution and extent of nest box installation across Victoria, and to provide an overview of faunal species reported as using nest boxes. Eighty-one respondents provided information on 98 'programs' that together support 9986 nest boxes. One to 1100 nest boxes were installed within programs. Most nest boxes (72%) had been installed by community/environment groups. Thirty-three native mammal and bird species used the nest boxes. More than half of the nest boxes (65%) were monitored at least once per year. Monitoring data of sixty-five percent of programs was curated and stored, but analysis or publication of results was completed for only a few programs. There is much potential to improve nest box program design and data management to help determine and increase conservation benefits for fauna. (*The Victorian Naturalist* 137 (1), 2020, 4–14)

Keywords: nest box, fauna habitat, community groups

Introduction

Nest boxes for wildlife are widely deployed in Victoria by individuals, community groups, researchers, and government and non-government organisations. They are installed for a variety of purposes, but mainly as a conservation tool to support native hollow-dependent fauna by increasing opportunities for nesting and denning, particularly where natural alternatives (e.g. tree hollows and hollow logs) have been reduced (Harley 2006; Harley 2016; Tzaros and Mentiplay-Smith 2016). They also can be used as a survey tool to detect cryptic species such as the Feathertail Glider (Ward 2000) (Appendix 1 provides scientific names of all species) and threatened Leadbeater's Possum (Harley 2004). Nest boxes are designed and installed for a wide variety of species, including those that are threatened, such as the Turquoise Parrot (Tzaros and Mentiplay-Smith 2016) and Brush-tailed Phascogale (Soderquist *et al.* 1996).

The installation, monitoring and maintenance of nest boxes in Victoria involves hundreds of volunteer hours and significant investment by government and other agencies. However, there is no overall picture of who is installing nest boxes, why, where, how many, which species are targeted, which species are using them, whether they are monitored and maintained, and what data are being collected. In addition, there is little information on the extent to which data from nest box programs are collated, analysed and outcomes published, thereby contributing to current knowledge on nest box effectiveness, and improvement of the contribution of nest boxes to species conservation.

Here, I summarise outcomes from a 2018 state-wide request for information aimed at obtaining an overview of the current deployment and use of nest boxes in Victoria. This type of overview information currently is not obtained easily, nor is it summarised elsewhere. Note that this is a descriptive summary of responses received and not an analysis of nest box use by fauna. For such examples, see Goldingay *et al.* (2018), Griffiths *et al.* (2018) and Rueegger *et al.* (2019).

Methods

How was information about nest boxes obtained?

Organisations that were known to, or had the potential to, coordinate, fund and support nest box installation, were contacted by email and asked to provide details about any projects with which they were involved. Email recipients were

asked to pass on a request to provide information about nest boxes (in the form of a publicly available project flyer and poster) to relevant contacts. Organisations initially contacted included the Department of Environment, Land, Water and Planning (DELWP), Parks Victoria, Catchment Management Authorities (i.e. Landcare coordinators), Trust for Nature, and all Victorian city and shire councils.

The project also was publicised via postings on the DELWP Twitter and Facebook channels, and as an item in the ARI *eNews* (electronic newsletter from DELWP's Arthur Rylah Institute for Environmental Research).

Those involved in nest box programs were asked to provide a range of information including: the number of nest boxes in the program; where they were located; which species they were targeting; what was considered before installation; which species had been recorded using the nest boxes; the level of maintenance undertaken; the type and frequency of monitoring; how data were stored; whether any data analysis and publication of results had occurred; whether records were submitted to public databases; and any information about funding sources and collaborators for the program.

Results

How many responses were received?

The information presented is based on responses from 81 individuals, groups or organisations, collectively representing 98 nest box programs and a total of 9986 nest boxes (Table 1; Appendix 1). Some respondents had nest boxes installed at several separate locations or for distinct purposes, and these groups of nest boxes were each defined as a 'program'.

Who is installing nest boxes and how many?

Most respondents were community-based conservation groups, followed by private individuals, government agencies, universities, and non-government organisations (including businesses) (Table 1, Appendix 2). Parks Victoria and Zoos Victoria were the most active of the government agencies. Community-based conservation groups and environmental organisations were responsible for 72% of the nest boxes. These included 'Friends of', 'Naturalist' and 'Environment' groups (n=11), Landcare groups and networks (21), Conservation Management Networks (3), and other non-affiliated interest groups (8). Guide Dogs Victoria was the only non-environmental group within these. The largest number of nest boxes in a single program (1100) was installed by a Conservation Management Network group (Whroo Goldfields). Appendix 2 lists respondents and categories.

The longest duration of a nest box program was 30 years (first boxes installed in 1988), established by the Field Naturalists Club of Victoria for the Brush-tailed Phascogale. At the other end of the scale, four of the reported programs were started in 2018.

Programs were supported financially by various sources including group members, private individuals (e.g. when installed on their own property), grant funding (e.g. from DELWP), or in-kind support via government (e.g. Parks Victoria, Catchment Management Authorities) and non-government organisations (e.g. the Wettenhall Environment Trust).

Where are nest boxes installed, and how are nest box numbers distributed?

Nest boxes reported in this survey have been installed at approximately 82 localities in Victoria (Fig. 1), from Tarragal and within the Big Desert in the west, to Orbost in the east; from Fish Creek in the south to Rutherglen in the north. The highest densities of nest boxes are in central Victoria, particularly south of Bendigo around Castlemaine, Macedon and Rushworth, to Kinglake and Bundoora. The north-east, between Benalla and Wodonga, also has a high density of nest boxes. Nest boxes were installed on private properties, in state forest, in national parks and other reserves, and in urban parkland. Nearly 40% of locations had from 1–20 nest boxes installed, with another 40% having 22–160 boxes. Eighteen locations had over 200 nest boxes installed (Fig. 1).

What is the reason for installing nest boxes, and what was considered beforehand?

Respondents were asked to describe the broad purpose of installing nest boxes, and the type of ecological information considered before installation.

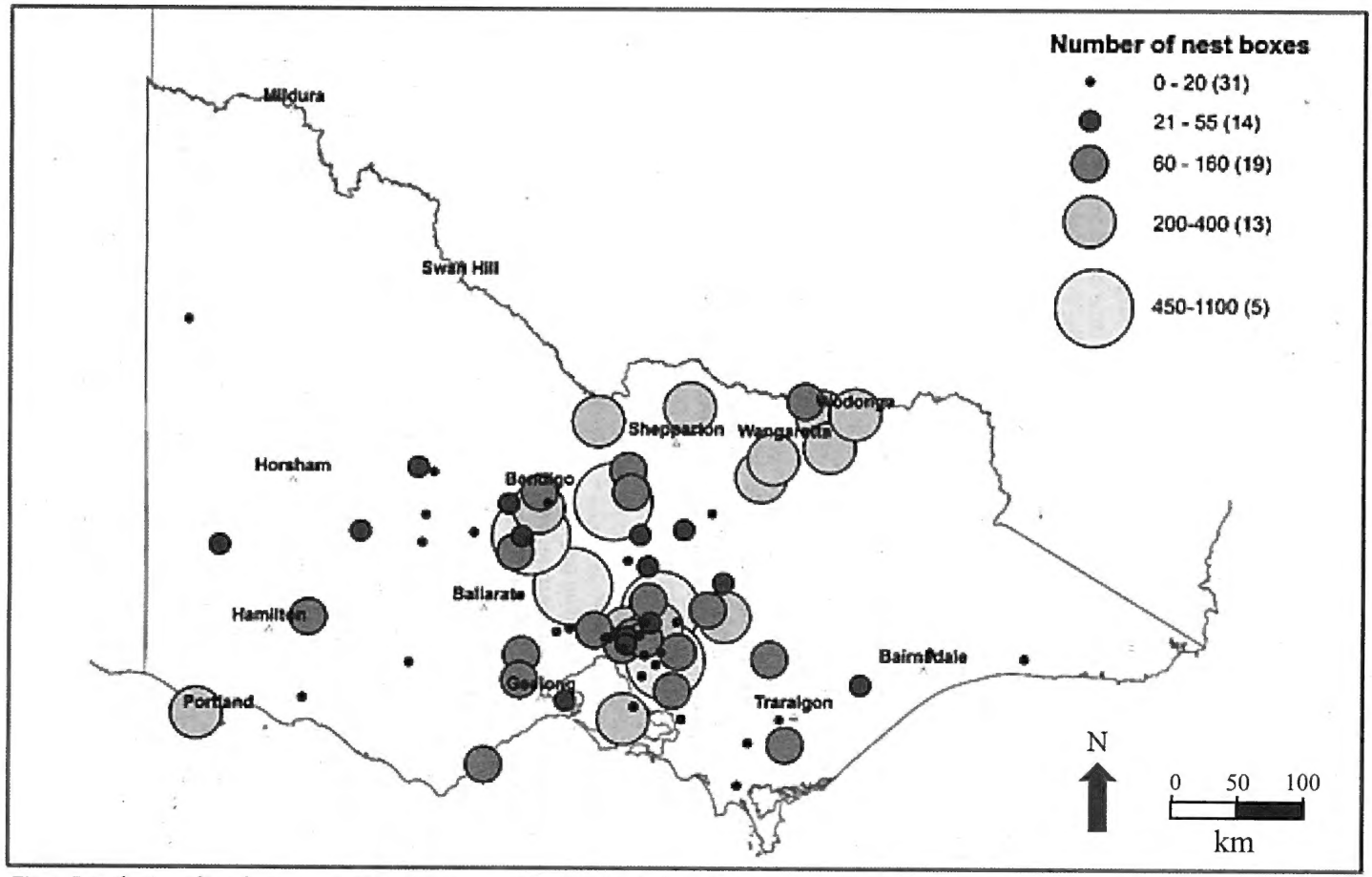

Fig. 1. Distribution of nest boxes across Victoria as reported by 81 individuals and groups representing 98 nest box programs. Circles represent a number-range of nest boxes in a general locality, with the number of individuals or groups represented by that range in parenthesis.

Table 1. Types of groups installing nest boxes for wildlife in Victoria, the number of nest boxes, and the range in number of nest boxes installed by each group (see Appendix 2 for further details).

Type of group	Number of groups	Total number of nest boxes	Range in number of nest boxes per group
Conservation Management Network	3	1689	39 – 1100
Friends of, Naturalist, Environment group	11	1103	6 – 300
Landcare group/network	21	2893	6 – 600
Other interest groups	8	1455	7 – 450
City/Shire Council	7	924	10 – 495
Government organisation	5	835	6 – 624
University	2	380	50 – 330
Company/business	2	286	116 – 170
Private individual	22	421	1 – 64
Total	**81**	**9986**	**1 – 1100**

Almost all respondents installed nest boxes to support wildlife conservation, with many citing their involvement in this activity as a response to a perceived lack of tree hollows in their target area. The lack of hollows was attributed to the impact of recent fires, to a history of timber harvesting or mining activity, or due to target areas being revegetation sites (e.g. on former cleared farmland) and therefore containing trees that were too young to have formed hollows. Contributing to habitat connectivity was also mentioned as a consideration. Other ecological information considered prior to nest box installation included: the quality of existing habitat; availability of suitable food resources; the context of the site in the landscape; the presence of native species and introduced predators; and the possibility of attracting pests such as feral European Honey Bees or the Common Myna. Several respondents provided extensive detail of aspects that had helped determine nest box placement. One respondent had engaged the services of an ecological consultant to assess a property and to advise on nest box placement.

Almost one-third of respondents aimed to support particular species, such as the Sugar Glider, with a high proportion also mentioning threatened species (e.g. Brush-tailed Phascogale). Otherwise, one or more broad animal groups were stated as the focus, such as birds, bats, and/or possums and gliders, or wildlife in general.

People also considered the construction, installation and monitoring of nest boxes to be an important community engagement and education tool that connected people with each other and with nature. This included involving local 'men's sheds' in construction, as well as primary and high school students. Sometimes, students, including those from universities, also were involved in monitoring, which they saw as a valuable opportunity to view and gain a better understanding of wildlife.

Nest boxes also were used as a survey method to detect the presence of particular species, to determine their distribution and to monitor them, or to determine more broadly species occurring in the area. Some less common reasons for installing boxes were: to provide alternative dens for Common Brush-tailed Possums to reduce their use of nearby roof spaces; to compare the use of nest boxes by particular species with that of hollows formed by chainsaws; to support Powerful Owls by increasing the numbers of possums (a major prey item); and to contribute to the recovery of a traumatised regional community impacted by extensive wildfires.

Which species were targeted?

Seventy-three programs included a specific species as the target for nest box use, collectively comprising 33 native mammal and bird species. Brush-tailed Phascogale, microbats and Sugar Gliders were the most commonly targeted mammals, followed by 'possums' or 'gliders' (in general), Common Ring-tailed Possum and Squirrel Glider. The Laughing Kookaburra was the most commonly targeted bird, followed by 'pardalotes', Powerful Owl, 'parrots' and 'ducks'. Seven threatened species (Department of Susutainability and Environment

2013) were specifically targeted, including Brush-tailed Phascogale, Powerful Owl, Squirrel Glider and Leadbeater's Possum. Species that were less commonly targeted (i.e. by one program only) included the Southern Greater Glider, Peregrine Falcon, Sacred Kingfisher and Rainbow Bee-eater.

Which species are recorded as using nest boxes?

Respondents from eighty-seven programs (89% of total) reported that nest boxes were being used by fauna, while six reported that their nest boxes were not used at all. Five programs did not include the monitoring of nest boxes. The Sugar Glider was the most recorded native species using nest boxes, detected in 51 programs (Table 2). Brush-tailed Possums (either Common, Mountain or unspecified) were the next most commonly recorded taxa (34 programs), followed by Brush-tailed Phascogale (28), Eastern Ring-tailed Possum (27), and Antechinus species (Agile, Yellow-footed or unspecified, 19). Rosellas (Crimson, Eastern or unspecified) were the most commonly recorded bird species (20 programs), with other commonly recorded birds being the Australian Owlet-nightjar (18 programs), 'ducks' (Pacific Black, Chestnut Teal, Australian Wood, teal in general or unspecified, 13) and Laughing Kookaburra (10). Some of the least commonly recorded species included the Feathertail Glider (3 programs), Striated Pardalote (2), and Eastern Barn Owl, Australian Magpie, Long-billed Corella and Major Mitchell's Cockatoo (all from one program each).

Six introduced species were recorded: European Honey Bees were recorded in 33 programs, Common Mynas in six, Black Rats in five, Common Starlings in four, and Common Blackbirds and the House Mouse in only one program each (Table 2). A variety of other animals, including insects (e.g. ants, caterpillars), reptiles (e.g. Marbled Gecko) and amphibians (e.g. Peron's Treefrog) also were found in nest boxes.

How often are nest boxes checked, and what is monitored?

There was a wide range in the frequency and regularity of monitoring. Checks varied from formal and regular checks of contents to opportunistic external observations. In almost all programs, nest boxes were checked at least once after installation. In 28% of programs (representing 15% of all nest boxes), they were checked twice yearly or more frequently, in 28% once yearly (49% of nest boxes), and in 39% less frequently (30% of nest boxes). Within six programs, nest boxes were not checked at all (5% of nest boxes).

Within, some programs, intermittent and irregular monitoring was carried out (e.g. once every 2-3 years or less), including where boxes had been checked only once since being installed. Monitoring frequency also varied over the life of some programs, with nest box checks initially occurring regularly, but decreasing over time and sometimes ceasing altogether. This was often linked to the availability of people, or the capacity to coordinate checking of boxes in different locations (e.g. on private properties spread over a large area). Alternatively, monitoring sometimes occurred more often during a particular year than in previous or subsequent years.

Some respondents provided details as to how nest boxes were checked (this information was not specifically requested). Nest boxes were mostly checked either by people climbing ladders, lifting the lid and looking inside; or from the ground by using a camera attached to a long pole. Equipment for the latter method often included a viewing screen that could be checked from the ground, as well as the option to take photos of box contents. Five programs used automated survey cameras (triggered by heat-in-motion) at a proportion of the nest boxes to monitor the entrance for animal activity.

The level of detail collected during nest box checks ranged from checks where no formal notes were taken to those where comprehensive observations were recorded. The type of details recorded by the various programs was highly variable. Types of information included geographic coordinates of individual box locations, unique identification labels, species of host tree, height above ground of box, direction box was facing, species the box was designed for, date installed, date checked, signs of occupancy (e.g. presence of nest including

Table 2. List of species recorded in nest boxes as reported from 98 nest box programs across Victoria. The values represent the number of programs in which a species, genus or animal type was reported as using nest boxes, ordered from most to least numerous. Where there were several options for a genus, the total for each option is shown in parenthesis. (Five nest boxes were not used, six nest boxes were not checked.)

Fauna recorded by nest box programs	Number of programs
Mammals – native	
Sugar Glider	51
Brush-tailed Possum	34
Common (17)	
Mountain (2)	
brush-tailed sp. (15)	
Brush-tailed Phascogale	28
Eastern Ring-tailed Possum	27
Antechinus	19
Agile (6)	
Yellow-footed (5)	
Antechinus sp. (8)	
Microbats (unspecified)	17
Squirrel Glider	11
Leadbeater's Possum	4
Possums (unspecified)	4
Feathertail Glider	3
Native rat and mouse (unspecified)	2
Mammals – non-native	
Black Rat	5
House Mouse	1
Birds – native	
Rosella	20
Crimson (9)	
Eastern (7)	
rosella sp. (4)	
Australian Owlet-nightjar	18
Duck	13
Australian Wood (5)	
Pacific Black (1)	
duck sp. (4)	
Teal	3
Chestnut (2)	
teal sp. (1)	
Laughing Kookaburra	10
Treecreeper	8
White-throated (4)	
treecreeper sp. (4)	
Lorikeet	5
Rainbow (2)	
Musk (1)	
Scaly-breasted (1)	
lorikeet sp. (1)	
Galah	5
Parrot	4
Red-rumped (1)	
Turquoise (1)	
parrot sp. (2)	
Birds (unspecified)	4
Striated Pardalote	2

Table 2. (cont.)

Fauna recorded by nest box programs	Number of programs
Birds – native	
Recorded once only: Eastern Barn Owl, Southern Boobook, Welcome Swallow, Australian Magpie, Long-billed Corella, Sulphur-crested Cockatoo, Red-tailed Black-Cockatoo, Major Mitchell's Cockatoo	8
Birds – non-native	
Common Myna	6
Common Starling	4
Common Blackbird	1
sparrow sp.	1
Insects – non-native	
European Honey Bee	33

shape and material, chewing around entrance, presence of scats), condition of box and whether maintenance had been carried out.

How are nest box data stored?

Monitoring data was stored for sixty programs (64%) either electronically (usually MS Excel spreadsheets, but sometimes in purpose-built software), on hard copy data sheets, or both. One respondent mentioned that electronic data entry was completed on site using mobile devices.

How are nest box data used?

The results of nest box activities had been disseminated via some form of publication for thirty-five nest box programs. This included via newsletters (e.g. Bender 2005), short informal field day reports, newspaper articles, unpublished and internal organisational reports (e.g. Hurley 2009), published reports (e.g. Tzaros and Mentiplay-Smith 2016) and journal articles (e.g. Dashper and Myers 2003; Harley 2016; Griffiths *et al.* 2017; Goldingay *et al.* 2018). Some groups posted results on their websites or via social media.

At least 13 nest box programs involved scientific input at the program design stage and/or during subsequent analysis. Some of these results have been published in peer-reviewed literature, including books or ecological journals (e.g. Harley 2004; Griffiths *et al.* 2017; Goldingay *et al.* 2018), or are in preparation for publication. Respondents of the above programs variously reported that they have used, or plan to use, their data as a survey and monitoring tool (Harley 2016), and to explore topics such as longevity of nest boxes (Goldingay *et al.* 2018), occupancy rates or use by species (Dashper and Myers 2003; Griffiths *et al.* 2017; Goldingay *et al.* 2018), post-fire recolonisation (Harley 2016), nest box maintenance rates (Goldingay *et al.* 2018), and the impact on local fauna community structure (Griffiths *et al.* 2018). One program was being undertaken as a PhD study, while several others have been included as a component of PhD studies (e.g. Griffiths *et al.* 2018).

Monitoring results for 29 nest box programs (encompassing 600 boxes: 6% of all boxes) were reported as having been submitted to public databases including 'Victorian Biodiversity Atlas' (VBA), 'Birdata' (BirdLife Australia) or 'Atlas of Living Australia'. Some respondents who had not submitted records expressed plans to do so, while others were not in the position to submit records due to incomplete monitoring or data not being stored.

Challenges associated with nest box programs

Although respondents were not directly asked to provide details of challenges associated with maintaining a nest box program, many volunteered this information, often to explain why

certain activities (e.g. monitoring) had not been completed.

Regular ongoing monitoring of nest boxes was something many groups found hard to achieve. Reasons given included: lack of time and the effort needed to coordinate people to check boxes; lack of resources for recording and storing monitoring data; uncertainty about what details to monitor and record; a reluctance to use ladders to reach nest boxes; and the cost and logistics of using an arborist to reach nest boxes as an alternative to using ladders.

Successfully dealing with infestations of ants or feral European Honey Bees was an ongoing challenge for some, leading to nest boxes being permanently removed in some cases. A few groups had called in apiarists to remove bees from nest boxes.

Submitting nest box data to public databases was seen by some as difficult and cumbersome, which meant this activity was not completed.

Conclusions

Currently a large number of nest boxes for wildlife are installed across Victoria. The estimate given here (~10 000) should be viewed as a minimum, as not all nest box programs were included in this project (e.g. duck boxes installed by Field and Game groups, penguin boxes installed by Phillip Island Nature Parks).

Nature-based community groups are a large contributor to nest box installations and involve a wide variety of group types from the incorporated or organisation-affiliated, such as Landcare groups, to less formal local environment or biodiversity groups. Central to their involvement is that this activity is regarded as a positive contribution to support native wildlife. Indeed, based on the information provided, a wide variety of species, including threatened species, are benefiting from nest boxes. The strong volunteer component of these groups demonstrates the importance of nest box related activities as a community engagement tool.

Information on nest box design, construction, appropriate sizes for specific species, and methods of installation is readily available (e.g. Franks and Franks 2003); however, less is known about the impact on fauna. While large numbers of individual animals from a range of species are recorded as using nest boxes (e.g. Goldingay *et al.* 2015; Harley 2016), little information is available on the type and extent of conservation benefits that are achieved. Questions around the factors influencing nest box use, the effects on populations and cross-species impacts remain unanswered. For example, does the use of nest boxes by individual animals have benefits for the population? What are the factors that most strongly influence use by native fauna? If there is an increase in nest box use by some common species, is this to the detriment of other less common species? Systematic studies are required that compare the status of local populations in relation to the installation of nest boxes *before* and *after* the installation of nest boxes (e.g. Griffiths *et al.* 2018). They could test, for example, whether the local population has increased in size because of the availability of nest boxes or whether there has been more successful breeding because of the availability of nest boxes. In addition, there are questions around the extent to which nest boxes may provide shelter for introduced species, such as feral European Honey Bees or Common Mynas (Harper *et al.* 2005).

The level of expertise, resources and coordination that such studies require are generally beyond most groups involved in nest box installation. Nevertheless, there is much scope for collaboration between scientists and community groups to obtain greater insight from current activities. At the very least, regular monitoring and effective data storage, if completed in a consistent and systematic way, would facilitate subsequent analysis, especially if it was made available to those with appropriate expertise (e.g. Goldingay *et al.* 2018).

Although not a comprehensive audit of nest boxes in Victoria, this exercise has provided base-line data on how and where nest boxes are being deployed by various groups and individuals, and the range of species known to take advantage of them. It also highlights that the challenges of monitoring and data storage are having an impact on the availability of potentially useful information that could contribute to our understanding of the degree to which nest boxes benefit faunal conservation.

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Appendix 1. Common and scientific names of fauna species mentioned in the text. * = listed as threatened in Victoria (DSE 2013); ^ = introduced species. Ordered taxonomically as per Menkhorst and Knight (2011); Christidis and Boles (2008); and Cogger (2018).

Common name	Scientific name
Mammals	
Agile Antechinus	*Antechinus agilis*
Yellow-footed Antechinus	*Antechinus flavipes*
Brush-tailed Phascogale*	*Phascogale tapoatafa*
Mountain Brush-tailed Possum	*Trichosurus cunninghami*
Common Brush-tailed Possum	*Trichosurus vulpecula*
Leadbeater's Possum*	*Gymnobelideus leadbeateri*
Sugar Glider	*Petaurus breviceps*
Squirrel Glider*	*Petaurus norfolcensis*
Southern Greater Glider*	*Petauroides volans*
Eastern Ring-tailed Possum	*Pseudocheirus peregrinus*

Appendix 1. (cont.)

Common name	Scientific name
Mammals	
Feathertail Glider	*Acrobates pygmaeus*
House Mouse^	*Mus musculus*
Black Rat^	*Rattus rattus*
Birds	
Australian Wood Duck	*Chenonetta jubata*
Chestnut Teal	*Anas castanea*
Pacific Black Duck	*Anas superciliosa*
Australian Owlet-nightjar	*Aegotheles cristatus*
Peregrine Falcon	*Falco peregrinus*
Red-tailed Black-Cockatoo*	*Calyptorhynchus banksii*
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*
Major Mitchell's Cockatoo*	*Lophochroa leadbeateri*
Galah	*Eolophus roseicapilla*
Long-billed Corella	*Cacatua tenuirostris*
Sulphur-crested Cockatoo	*Cacatua galerita*
Rainbow Lorikeet	*Trichoglossus moluccanus*
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*
Musk Lorikeet	*Glossopsitta concinna*
Australian King Parrot	*Alisterus scapularis*
Crimson Rosella	*Platycercus elegans*
Eastern Rosella	*Platycercus eximius*
Red-rumped Parrot	*Psephotus haematonotus*
Turquoise Parrot*	*Neophema pulchella*
Powerful Owl*	*Ninox strenua*
Southern Boobook	*Ninox boobook*
Eastern Barn Owl	*Tyto delicatula*
Laughing Kookaburra	*Dacelo novaeguineae*
Sacred Kingfisher	*Todiramphus sanctus*
Rainbow Bee-eater	*Merops ornatus*
White-throated Treecreeper	*Cormobates leucophaea*
Striated Pardalote	*Pardalotus striatus*
Australian Magpie	*Cracticus tibicen*
Welcome Swallow	*Hirundo neoxena*
Common Blackbird^	*Turdus merula*
Common Starling^	*Sturnus vulgaris*
Common Myna^	*Acridotheres tristis*
Insects	
European Honey Bee^	*Apis mellifera*
Reptiles	
Marbled Gecko	*Christinus marmoratus*
Amphibians	
Peron's Tree Frog	*Litoria peronii*

Appendix 2. List of respondents who provided nest box data by group category.

Group category, name of group or location

Conservation Management Network

Broken Boosey Conservation Management Network, Kara Kara Conservation Management Network, Whroo Goldfields Conservation Management Network.

Friends of / Naturalist / Environment group

Friends of Brisbane Ranges, Friends of Chiltern Mt Pilot National Park, Friends of Glenfern Valley Bushlands, Friends of Morwell National Park, Friends of Organ Pipes National Park, Friends of Wilson Reserve, Friends of Yarramie Reserve, Bendigo Field Naturalists Club, The Field Naturalists Club of Victoria, Melton Environment Group, Montmorency Biodiversity Group.

Landcare group/network

Basalt to Bay Landcare Network, Bellarine Landcare Group, Christmas Hills Landcare Group, Hughes Creek Catchment Collaborative, Mid-Loddon Sub Catchment Management Network, Monbulk Landcare Group, Moorabool Catchment Landcare Group, Northern Bendigo Landcare Group, Pinkerton Landcare & Environment Group, Rutherglen Landcare Group, Smiths Gully Landcare Group, Snowy West Landcare Group, Strath Creek Landcare Group, Strathallan Family Landcare Group, Tarragal Landcare Group, Toomuc Landcare Group, Upper Goulburn Landcare Network, Watson Creek Catchment (Landcare) Group, Westernport Swamp Landcare Group, Wodonga Urban Landcare Network, Wye Weed Warriors (Wye to Wongarra Landcare Group).

Other interest groups

Connecting Country Inc., Darebin Creek Management Committee Inc., Guide Dogs Victoria, Mammal Survey Group of Victoria Inc., Mount Elephant Community Management Inc., Regent Honeyeater Project, Seymour Bushland Park Committee of Management, Trust for Nature.

City/Shire Council

City of Greater Dandenong, Indigo Shire Council, Knox City Council, Macedon Ranges Shire Council, Moonee Valley City Council, Mornington Peninsula Shire Council, South Gippsland Shire Council.

Government organisation

Barwon Water, DELWP (now maintained by private individual), Parks Victoria, Red-tailed Black-Cockatoo Recovery Team, Zoos Victoria.

University

La Trobe Wildlife Sanctuary, Southern Cross University.

Company/business

Dunkeld Pastoral Company, Themeda Rural.

Private individuals

Bailieston, Broadford, Campbell's Creek, Chum Creek, Clifton Creek, Cottles Bridge, Emu Creek, Fish Creek, Kalorama, Muckleford, Nowhere Creek, Parwan, Smiths Gully, St Arnaud, Steiglitz, Stratford, Strath Creek, Strathbogie, Upwey, Warrandyte.

Unexpected discoveries in Banksia Park, Bulleen, Victoria

In 1841, a punt was installed on the Yarra River at the site of the present busy Banksia Street Bridge. It opened a route between Melbourne and the Bulleen–Templestowe area that enabled the early European settlers to farm the rich river flats. Banksia Park was the first part of the Yarra Valley Parklands to be opened to the public in 1978. The park is bounded on one side by a major arterial road and on the other by the Yarra River. During a recent visit in early October, 2019, I stumbled upon three unexpected sights.

The first was a grove of Japanese cherry trees. In 1980, the Japanese government donated one hundred flowering cherry trees to the people of Victoria to mark the visit of the Japanese Prime Minister. They were originally planted in Jells Park, Wheelers Hill, but were relocated to Banksia Park in 1988. The cherry tree genus *Prunus* sp. contains over 100 varieties. Their blooming is spectacular but short-lived. In Banksia Park, it takes place during a few weeks in October (Fig. 1).

Hanami, or flower-viewing, is the traditional Japanese custom of enjoying the transient beauty of the *sakura*, or cherry blossoms. *Hanami* often consists of having parties beneath the trees with family and friends. Forecasting the dates that the cherry trees will be in bloom is a serious business in Japan. Factors to be taken into account include the species, latitude, altitude, temperatures and rainfall. The first flowering occurs in mid-January on the island of Okinawa. In Tokyo, flowering is usually around mid-March, and in Sapporo, on the northern island of Hokkaido, flowering occurs in early May. The Japanese cherry blossom season is rich with cultural significance and has become world-famous, now attracting hundreds of thousands of tourists.

As I walked on, another delightful experience awaited. I came upon a pair of Australian Wood Ducks (also known as the Maned Goose) *Chenonetta jubata* shepherding a brood of ducklings. It was a very large group and I counted them several times. Astonishingly,

Fig. 1. Part of the grove of cherry trees in Banksia Park, Bulleen.

Fig. 2. A pair of Australian Wood Ducks *Chenonetta jubata* shepherding a very large brood of ducklings in Banksia Park, Bulleen.

there were twenty-one young, all feeding greedily on the lush spring grass. Australian Wood Ducks feed on grasses, clover and herbs and, occasionally, insects. Males have a brown head with a small mane, a speckled brown-grey breast, silver-grey wings and two black stripes along their back. Females have a paler head with distinctive white stripes above and below the eyes, and a speckled breast and flanks.

The Australian Wood Duck's maximum egg-clutch size is variously recorded as eleven to sixteen <www.birdsinbackyards.net> (accessed 6 October 2019). Why then was this pair raising twenty-one ducklings? I have no definitive answer, although I have observed similar large groups of ducklings in the past. Possibly the adults had adopted babies whose parents had died or deserted them? Perhaps Australian Wood Ducks creche their young? Groups of up to thirty-one ducklings with a single pair of adults have been recorded on <www.birding-aus.org> (accessed 6 October 2019). As grazers, Australian Wood Ducks are among the few native birds that have benefited greatly from land clearing.

Continuing my circuit of the park, I noticed a patch of blue in the grass and hurried over to get a better look. Banksia Park had delivered again: they were bluebells, *Hyacinthoides non-scripta*. It was a small patch, hardly a carpet, but they were growing under an oak tree that was just putting out its new lime-green foliage (Fig. 3). When I first travelled to England in early 1977, I arrived just as the bluebells were flowering in the woods; as I am of British heritage, they have always had a special importance for me. When I knelt to take photos, I discovered something else. Not all the flowers were blue: many were white or pink (Fig. 4).

It was clear to me that in the park, the bluebells' very short flowering period aligns with that of the cherry trees. Banksia Park in Bulleen may be one of the few places where these two fleeting sights, belonging to distant parts of the world, can be enjoyed together. I am certain my musings and the small scale of the plantings will not be sufficient to attract a fleet of tourist buses. However, I did speak to a lady who expressed almost identical sentiments as she admired the bluebells while having morning tea under the oak.

Another visit to Banksia Park on 11 October 2019 was a scenario of highs and lows. I was overjoyed to find the cherry trees at peak flowering. The grove contained a range of species, and the blossoms varied in colour from lipstick pink to white. Some of the trees had

Fig. 3. Patch of bluebells in bloom, Banksia Park, Bulleen.

Fig. 4. Some of the blue (and pink) bells in bloom, Banksia Park, Bulleen.

simple flowers with five petals, and others had flowers resembling little pink pom-poms. A lovely touch was added by a Laughing Kookaburra perched on a branch as it scanned the ground for food.

After a short search I located the family of Wood Ducks, counted carefully and yes, there were still twenty-one ducklings. The babies were resting together in the grass in a tight group, under the watchful eyes of the adults. But where were the bluebells? I looked around puzzled and then, suddenly, it hit me. The grass had been cut and my precious patch of bluebells had been chopped up under the blades of a mower.

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Lorne's Buff-banded Rails

Crakes and rails are an interesting group of cryptic wetland birds within the Family Rallidae. The smaller species are especially elusive and their far-carrying calls are often the only evidence of their presence (Menkhorst *et al.* 2017). Crakes and rails have narrow bodies, a feature which allows them to slip easily through dense vegetation (Pizzey 1980).

Whilst the smaller species are not commonly seen by many bird enthusiasts, one of the larger species, the Buff-banded Rail *Gallirallus philippensis,* is the most frequently seen rail in south-eastern Australia (Menkhorst *et al.* 2017). The Buff-banded Rail inhabits virtually all swamps and marshy areas including those in coastal regions. The species also frequents more human environments such as ornamental ponds and gardens (Menkhorst *et al.* 2017).

At Lorne, on Victoria's surf coast, approximately 120 km south-west of the Melbourne CBD, excellent habitat for this species is present in the lower sections of the Erskine River. A large area of sedge/rush vegetation stretches along one side of the river in the estuary section. When the river is at a low level a sandy, muddy bank is exposed along the edge of this dense marshland (Fig. 1). A second site further upstream with a garden bed of native plants provides a dense barrier between a small grassy area above the river bank and the adjacent supermarket car park. A line of *Juncus* sp. extends along the river bank below the grassy area (Fig. 2).

I have been fortunate to observe Buff-banded Rails at both sites for many years (Fig. 3), and probably saw the species for the first time in Lorne about 20 years ago. As one would expect, the best times to see the species have been very early in the morning or late in the afternoon or evening. Both sites have an unobstructed view across 20 to 30 metres of open water and can be viewed easily from the opposite side of the river using binoculars.

At the estuary site other species, such as White-faced Heron *Egretta novaehollandiae* and Masked Lapwing *Vanellus miles*, are obvious, but with patience and careful observation

Fig. 1. Estuary section of Erskine River.

Fig. 2. Supermarket site, Erskine River.

Fig. 3. Buff-banded Rail at supermarket site. Photo Jenny Sexton.

one or two Buff-banded Rails may be seen to emerge suddenly from within the dense vegetation to feed on invertebrates. Any sudden noise or sign of danger causes the rails to sprint across the exposed sand bank and disappear instantly into the dense tussocks. At the supermarket site, Buff-banded Rails appear to be even more wary. Whilst the rails in the estuary spend considerable time feeding in the open, with a constant flick of their tails, those at the upstream site move carefully through the grass, continuously checking for danger. The other water birds that share this section of the river, Pacific Black Duck *Anas superciliosa* and Australian Wood Duck *Chenonetta jubata*, are very used to shoppers, cars and other human activities and are almost tame. However, the Buff-banded Rails disappear quickly into the dense garden bed at the first sign of danger or even the slamming of a car door. Very occasionally, a rail will fly across to the other side of the river, well away from disturbance. Many years ago, the marshland area in the estuary was badly degraded, but fortunately a revegetation program has transformed this area back to what may be its original condition. Clearly, this marshland provides ideal habitat for the Buff-banded Rail. Further monitoring may reveal that other species of crakes and rails also frequent this site.

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Contact mobbing of a human by Apostlebirds *Struthidea cinerea* in response to one of the flock being captured

The Apostlebird *Struthidea cinerea* is a gregarious passerine found mostly in inland areas of eastern and northern Australia (Woxvold and Mulder 2008; Mo 2015). It is renowned for its social units of three to 20 birds that generally consist of one breeding pair and helpers (Higgins *et al.* 2006), largely comprising offspring from previous broods (Woxvold and Magrath 2005; Griesser *et al.* 2009). They are also prolific mobbers, warning off heterospecifics such as snakes and ravens (Berne 2011). A number of bird species use this anti-predator strategy to either distract, drive away or even kill potential predators (Chiver *et al.* 2017; Cunha *et al.* 2017). Mobbing tactics range from emitting alarm calls from a distance (Carlson *et al.* 2017) to aggressively approaching a mobbing target, which may involve making physical contact (Mo *et al.* 2016).

While travelling through the Central West region of New South Wales in October 2012, I inadvertently experienced contact mobbing from Apostlebirds. This encounter occurred in a patch of remnant bushland near the township of Dubbo, 302 km north-west of Sydney. I first noticed the flock of Apostlebirds when they were foraging on the ground. From a distance of 30 m, one bird was observed to have a strand of fishing wire caught around its left foot. To remove the fishing wire, I used some string to form a lasso in order to capture the bird. The birds were attracted toward the lasso by the offer of some bread. Once the target bird was lured to step into the lasso, this was gently tugged to attempt to fasten the lasso around one of its feet. Each time the lasso was tugged, fewer birds were attracted to feed. Fortunately though, the target bird was finally captured after about eight attempts.

Once captured, both the bird in my hand (Fig. 1) and the others in the flock were very vocal. The fishing wire was removed in a few

Fig.1. The captured Apostlebird *Struthidea cinerea* in the hand.

minutes and did not appear to have caused external damage. During the time I held the bird, the flock remained within 5 m, spread across perches of surrounding Cypress Pines (Fig. 2). Both the flock and captured bird were highly vocal throughout this time. Within 10 seconds of holding the bird, members of the flock made vocal swoops on the back of my head. I used my hood to provide some protection; however, the impact of the birds' feet and beaks could be easily felt. This apparent attempt to distract and apply pressure worked when my hold of the bird relaxed after the wire was removed, allowing the bird to escape.

After the bird escaped, I remained seated for about five minutes to observe the captured bird for any obvious movement impairments from its foot being entangled in fishing wire. Contact mobbing ceased but the flock continued to encircle me, albeit at a further distance. Their vocalisations continued but were less frantic. They did not disperse from the vicinity during this time, with the encounter ending when I moved on.

In animals, living in social groups has a number of advantages such as conserving energy (Scantlebury *et al.* 2006) and reducing predation risk by collectively detecting predators (Boland 2003) or diluting predator risk for the individual (Lehtonen and Jaatinen 2016). The observation reported here demonstrates how the willingness of Apostlebirds to defend a conspecific through contact mobbing was advantageous for the captured individual (c.f. Eberle and Kappeler 2008). The encounter remains the only situation in which I have handled a wild Apostlebird. I would assume that similar observations could be made if others were to capture and handle Apostlebirds at least at this location.

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Fig. 2. The remainder of the flock of Apostlebirds perched in surrounding Cypress Pines.

Long-term pairing of two domesticated ducks now living wild: a Muscovy Duck *Cairina moschata* and a Mallard *Anas platyrhynchos*

The Centennial Parklands is a 220-ha green space located 4 km from the Sydney central business district, comprising remnant natural habitats surrounded by sporting fields, gardens and equine facilities (Hamilton and Penny 2015; Mo 2019a, 2019b). The network of lakes throughout the parklands provide suitable refuge for a variety of wildlife, most notably native waterfowl (Keast 1995; Ross 2014). A number of exotic birds also have appeared at the parklands at various times (Tarr 1950). At least three species of domesticated waterfowl are now naturalised; the Mallard *Anas platyrhynchos* (Braithwaite and Miller 1975), native to temperate and subtropical regions of the Americas, Eurasia and northern Africa; the Muscovy Duck *Cairina moschata*, native to Mexico, Central and South America; and the Greylag Goose *Anser anser*, native to Eurasia.

The author visited the Centennial Parklands sporadically from 2006. During this time, there have been a small number of domesticated Muscovy Ducks and one domesticated Mallard drake present at the site. In November 2007, this Mallard drake was first observed following a domesticated Muscovy Duck hen between two lakes (Fig. 1). Since this first observation, the pair was consistently observed together on 18 subsequent visits. While many of the resident waterfowl in the parklands were habituated to being in close proximity to people, the Mallard and Muscovy Duck pair were notably less approachable. Both birds hissed at people who approached; however, this behaviour was generally more pronounced in the Mallard drake (Fig. 2).

This pairing is not unusual considering that numerous Mallard × Muscovy Duck hybrids

Fig. 1. The Mallard drake and Muscovy Duck hen photographed at the Centennial Parklands in November 2007.

Fig. 2. The Mallard drake hissing as the author approaches.

have been observed and reported in scientific literature (e.g. Crew and Koller 1937; Poulsen 1950). Furthermore, mate fidelity has been observed in other duck species (Williams and McKinney 1996; Smith *et al.* 2000). Cushing and Ramsay (1949) documented a brief association between a Mallard and a Muscovy Duck, which continued until one of the birds was killed.

Interestingly, the pairing reported here has persisted for more than 10 years despite the presence of other Muscovy Duck drakes at the Centennial Parklands during this time (Fig. 3). It is possible that the two birds originated from the same captive situation and have maintained their pairing since being released.

Fig. 3. One of the Muscovy Duck drakes observed at the Centennial Parklands in February 2008.

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One Hundred Years Ago

Some introduced animals

BY G.A. KEARTLAND

THE CAT. — I doubt if there is any domestic animal which has adapted itself so readily to its environment as the cat. It is true that in some cases they have been turned loose on sheep stations to destroy rabbits, but it must be borne in mind that many have escaped to the shore from wrecks on our coast. The fact remains that they are now in a wild state all over Australia and on many of the islands round our coast. At King Island, Kent Group, and several other islands in Bass Strait I have seen either live cats or the skeletons. I have found them in many parts of Victoria and Riverina. At Myrniong there are many long-coated ones, which would lead to the assumption that a number of Persian cats had been turned loose. Whilst with the Calvert Exploring Expedition in the desert of North-West Australia, in 1896, our party disturbed a fine large tabby cat from a hollow log at a place at least 400 miles from the nearest human residence; but when we reached a lagoon south of the Fitzroy River I counted the skeletons or skulls of forty-seven cats, which had probably died of thirst when the lagoon had dried up. When caught in a trap they are the most formidable animals in Australia to deal with. The natives in the North-West relish cats as food, as they are all very fat. On one occasion I shot one, and offered a lubra the choice of the cat or a pair of Wild Ducks for her dinner. She preferred the former, as it was nice and fat.

From *The Victorian Naturalist* **XXXVII**, pp. 99-100, December 9, 1920

2019 Australian Natural History Medallion

Dr Simon Grove

The 2019 Australian Natural History Medallion has been awarded to Dr Simon James Grove for his contribution to natural history, entomology and malacology. Simon was nominated by The Tasmanian Field Naturalists Club Inc. (TFNC).

Simon Grove is a Tasmania-based naturalist with a life-long passion for natural history, especially insects and marine molluscs. He is driven by a deep affection for the natural world more broadly, and a desire to enthuse others in its study and conservation.

Simon grew up in southern England, where his naturalist interests were encouraged from an early age. At the age of six, he had his own wildflower press and 'herbarium'; by nine he was volunteering in his local museum; and by ten he ran his own public shell 'museum' out of his bedroom. Butterflies and moths became his passion following the long, hot summers of the mid-70s; and he reared many species in netted cages in the back garden. It was at this time also that his enduring interest in nature photography took hold. During his teens he set up a natural history club at school, and joined the local natural history society in which he was an avid birdwatcher, contributing to numerous surveying and monitoring projects.

At university he studied marine biology, pollution ecology and conservation biology, and was then employed for several years as an ornithologist, botanist and more especially an entomologist, for a range of UK nature conservation bodies including the Nature Conservancy Council, Royal Society for the Protection of Birds and National Trust.

After taking a Masters degree in forestry, Simon worked on forestry and conservation training projects in Uganda and Indonesia. In 1997, he moved to Cairns to undertake doctoral research on saproxylic (dead-wood associated) insects and sustainable tropical rainforest management.

In 2001, Simon accepted a position as a conservation biologist with Forestry Tasmania. Over the ensuing decade, he researched and published on a range of topics dealing mostly with ways to improve forest management for biodiversity, using beetles, birds and fungi as study groups. In the process he greatly expanded the Tasmanian Forest Insect Collection (TFIC), and also developed comprehensive websites for TFIC and for the Warra Long-Term Ecological Research (LTER) Site. Simon produced many research publications and conference presentations on forest conservation biology, and presented a series of lunchtime talks to the general public at Forestry Tasmania on these themes, with titles such as 'Messy forests are healthy forests'.

Moving on to work as a conservation planner at Forestry Tasmania and becoming head of its Sustainability Branch, Simon created management prescriptions for retention of coarse woody debris habitat and ensured that they were embedded in management systems. He was involved in developing strategic management plans for threatened species in state forest, including the Swift Parrot, Giant Velvet-worm and Mount Mangana Stag-beetle. He was also instrumental in developing landscape planning and monitoring tools for forest reserves, for old-growth forest and for mature-forest influence in state forest.

Simon and his wife Chris joined the TFNC soon after their arrival in Tasmania, and Simon soon became an occasional presenter of evening talks, leader of fieldtrips, and a regular contributor to the Club's journal, *The Tasmanian Naturalist*, of which he served for a time as editor. Simon was also a member of the Tasmanian Marine Naturalists Association from 2002 up to its last meetings in 2011 and led several excursions. He also contributed to a partial re-write and subsequent re-publication of their field-guide *Between Tasmanian Tides*. On settling in Tasmania, Simon rediscovered his inter-

est in seashells. Often, with family in tow, over a period of a decade he comprehensively surveyed seashells on more than 400 Tasmanian beaches, amassing a collection of 16 000 shell lots (comprising over 67 000 individual shells). To document these, he established the 'Molluscs of Tasmania' website (www.molluscsoftasmania.org.au), which displays photographs of most of these species.

Perhaps unsurprisingly, his local beach at Taroona is one of the top-ranked, having yielded an impressive 350 species—the subject of two publications in *The Tasmanian Naturalist*. Audio of Simon and his son Ben talking about seashells is featured on the Taroona Foreshore Discovery Trail app. His malacological interests eventually led to the definitive study *The Seashells of Tasmania: A Comprehensive Guide*. The first edition was published by the TFNC in 2011; a second edition appeared in late 2019.

Simon is a competent birdwatcher, and can identify most local species by their calls. His teams (most recently named 'The Has Bins, featuring the Forty-Spotted Teenagers') have won the Tasmanian Twitchathon twice in recent years, raising money through sponsorship for Tasmanian bird conservation in the process.

In 2012 Simon moved to the Tasmanian Museum and Art Gallery (TMAG), where he remains the Senior Curator, Invertebrate Zoology. He donated his shell collection to the Museum, substantially improving the extent and coverage of the Museum's holdings. The Tasmanian Forest Insect Collection also followed him to the Museum, vastly expanding the Museum's collections in this area.

As curator, he has been involved in a wide range of invertebrate research, as well as continuing to engage extensively in natural history studies in his spare time. His survey of the marine molluscs of King Island, with fellow enthusiast Rob de Little, added several new species to the Tasmanian list and clarified many historical records. Rob and Simon subsequently undertook an extensive dredging survey of the marine molluscs of the Port Arthur area, where they recorded about 600 species, many of which had not been seen for a century, and 40 of which were new to science. Simon has also been involved in the TFNC's series of Central Plateau fieldtrips to research the Miena jewel beetle *Castiarina insculpta*, a species which had once been considered extinct. On one of these trips he found and photographed the female beetle ovipositing, as well as the beetle's emergence hole, thereby establishing the food plant for its larvae. Recently, he identified two species of heteropteran bug and one species of beetle, each of which represent families new for the Tasmanian fauna. Simon's assistance to other scientists with their research and access to specimens has been honoured by having a genus of Tasmanian land-snail, a species of marine snail, and several beetle and fly species named after him. Simon has mentored several museum volunteers in the sorting and identification of mollusc and insect specimens, leading, in one case, to a paper co-written with museum volunteer and TFNC club member Don Hird on the surprising frequency of sinistral (reversed) specimens of a gastropod mollusc dredged from the Tasman Sea.

Simon maintains a Flickr site of more than 2900 of his Tasmanian natural history photographs (https://www.flickr.com/photos/simongrovetmag/), and receives regular requests for permission to publish these in guide-books, articles and magazines—requests which are granted without fee. His photograph of the Tasmanian endemic semi-slug *Attenborougharion rubicundus* was widely published when the transfer of the species to a genus named after Sir David Attenborough received widespread media publicity. Most of his photos have also been submitted to *iNaturalist*, where quite a few have become the primary 'species' photo. From *iNaturalist*, many of these photo-based observations also end up on the 'Atlas of Living Australia', and his photos are prominent in many of the species-level image galleries there. Simon has become one of the top identifiers of other's Tasmanian observations on *iNaturalist*, entirely in his own time. He established the Tasmanian Marine and Seashore Life Facebook group and regularly posts photos to it

and to the Tasmanian Insects and Spiders Facebook group, the Field Naturalists of Tasmania Facebook group, and his professional TMAG Facebook page. The TMAG app 'Field Guide to Tasmanian Fauna', the local production of which Simon coordinated, and which features many of his photos, has been downloaded thousands of times. His photos and words also appear in natural history information brochures and displays, for example for the Mount Field Discovery Centre and the Three Capes Walk.

Simon has made a few dozen radio and TV appearances in the past few years, speaking on subjects as diverse as mollusc dredging, Paper Nautilus beachings, Miena Jewel Beetle research, Swift Parrots, and deadwood ecology. Media featuring his work have included ABC Radio National's Science Show and ABC TV news, *The Mercury* newspaper, Southern Cross TV's 'Going Bush' and Foxtel's 'Coast Australia'. Simon continues to engage with the wider public, for instance through the Forest Education Foundation, talks to the Friends of the Tasmanian Museum and through BeakerStreet, a pop-up science bar that operates from the Museum each year during Science Week.

The medallion was presented to Simon by the Vice President of the Royal Society of Victoria, Nick Williams, on 11 November 2019.

Maxwell Campbell
Secretary, ANHM Committee
Field Naturalists Club of Victoria
PO Box 13
Blackburn, Victoria 3130

Australian Natural History Medallion Trust Fund

Since November 2018 and up to November 2019, donations to the Trust Fund have been gratefully received from the following:

	$		$
Julia Davis	10	David Munro	10
Peter Fagg	34	Brendan Murphy	50
Sue Forster	25	A Murray	15
Bill McInnes	15	Robert Rogers	50
G Markowsky	20	Gerry Swan	85
Sapphire McMullan-Fisher	10	Troy Williams	16

If you would like to contribute to this fund, which supports the Australian Natural History Medallion, donations should be sent to: The Treasurer, Field Naturalists Club of Victoria, PO Box 13, Blackburn, Victoria 3130. Cheques should be made payable to the 'Australian Natural History Medallion Trust Fund'.

The medallion is awarded annually to a person who is considered to have made the most significant contribution to the understanding of Australian natural history.

Maxwell Campbell
Secretary, ANHM Committee
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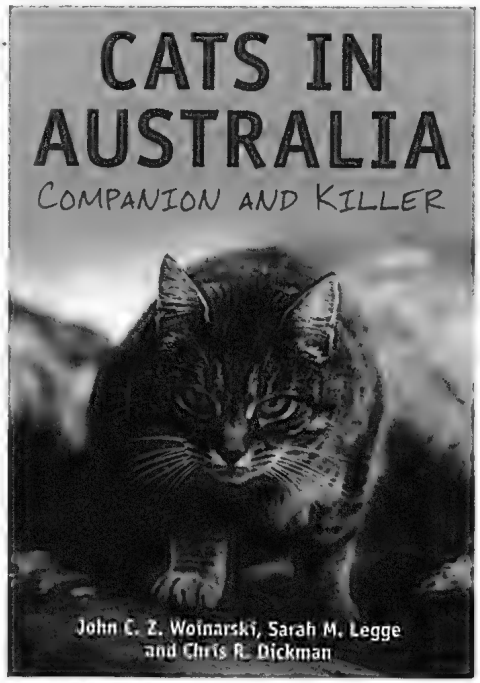
Cats in Australia: companion and killer

John CZ Woinarski, Sarah M Legge, and Chris R Dickman

Publisher: *CSIRO Publishing, Clayton South, 2019. 333 pages, paperback.*
ISBN 9781486308439 . RRP $59.99



Australia is the only continent (apart from Antarctica) that has no native felids (members of the family Felidae, the cats—large and small). This simple fact is part of the reason that the introduced Domestic Cat *Felis Catus* has had such a devastating impact on our native wildlife—i.e. it was presented with a continental fauna ill adapted to such a sophisticated hunter. Further, given the early decline of native predators after European occupation, our continent was easily conquered.

It's hard not to admire the Domestic Cat—it is one of the most successful species on the planet. Its natural history is characterised by versatility and flexibility—in habitat, hunting behaviour, social organisation and mating system. This has allowed it to establish wild populations in the face of other established predator communities throughout the world.

Recent research (thoroughly reviewed in this book) establishes that in Australia for about two centuries now, feral Domestic Cats have consumed enormous numbers (many tens of millions annually) of Australia's small reptiles, small- to medium-sized mammals, birds and large invertebrates. At best, the impact has been to constrain prey populations to refugia where persistence is possible because of particular features providing shelter, such as dense ground cover or rock piles; at worst, the Domestic Cat has driven numerous extinctions, particularly of small- to medium-sized mammals. There is also convincing evidence that Cats continue to play an important role in many of the ongoing species declines, most worryingly in northern Australia where declines were less evident until recent decades. As a sit-and-wait predator, the Domestic Cat can inflict enormous damage on those native rodents and reptiles that live in burrows, such as the Smoky Mouse *Pseudomys fumeus*, by simply waiting and pouncing on any emerging animal.

In this detailed compilation, three of Australia's pre-eminent vertebrate ecologists set out to 'describe, understand and contextualise the issue of free-ranging Cats in Australia'. In addition to the detailed (and depressing) documentation of evidence for the Domestic Cat's key role in many vertebrate declines and extinctions in Australia, the authors present a wealth of background information about *Felis Catus*, ranging from its origins, domestication and global spread, to the biological, legal and

ethical challenges of managing the feral and semi-domesticated populations that now occur throughout our continent.

The reasoned and dispassionate coverage of the complex social and political dimensions of Cat management in Australia is one of the book's strong points. For example, in Victoria the recent and long overdue declaration of the feral Domestic Cat as a declared pest animal applies only on certain Crown Lands and only in areas where the conservation of biodiversity 'is a high priority' (this reviewer struggles to think of any Crown Land where that does not apply—the MCG perhaps). These restrictions are designed to protect roaming pets, effectively turning a blind eye to the fact that all Cats will hunt, regardless of how well fed they are.

The authors finish with a plea to advance from past and current 'meek and ineffectual' attempts to reduce the impacts of threats to biodiversity such as the Domestic Cat. They call for our society to aim to eradicate feral Cats from our country within a generation. If you are not convinced of the need to achieve this aim, or you wish to be fully appraised of the arguments for and against, you need to read this book.

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Dragon Lizards of Australia: evolution, ecology and a comprehensive field guide

Jane Melville and Steve K Wilson

Publisher: *Museums Victoria Publishing, Melbourne, Victoria, 2019.*
406 pages, paperback. ISBN 9781921833496. RRP $49.95

One of the challenges of producing a natural history reference book is to present the publication in such a way that makes it easy to use by a wide range of readers. In recent times *The Australian Bird Guide* by Peter Menkhorst *et al.* and *Reptiles of Victoria* by Peter Robertson and John Coventry have been exemplary. These two long-anticipated reference books provide essential information for serious bird and reptile researchers, but also give easy access to those who may be starting out in the study of these vertebrates. Now we see the publication by Museums Victoria of *Dragon Lizards of Australia: Evolution, Ecology and a Comprehensive Field Guide*, making a trio of wonderful wildlife reference books. This new book is part of Museums Victoria Publishing field guides series.

The authors, Jane Melville and Steve Wilson, are both known in reptile circles as well-qualified and experienced herpetologists. Indeed, Jane Melville has been employed since 2002 by Museums Victoria, where she is now the Senior Curator of Herpetology and has been the lead author in a wide range of published scientific papers, especially on Australian dragons. Steve Wilson has been associated with the Queensland Museum for many years and has authored or co-authored numerous books on herpetology.

This new book is broadly made up of three parts, with the first part covering evolution, ecology and biology; the second contains a very helpful glossary and a quick guide to genera; and the third is a comprehensive field guide. The first part starts with a definition of a dragon lizard and clearly describes the features that distinguish dragons from other lizards. World maps are included, showing the different distributions across the globe of dragons compared with iguanas and chameleons. The sections that follow cover classification and origins of the

dragon family (Agamidae), life history, habitat, distribution and conservation. Excellent photographs supporting all the information contained in these sections are included.

The guide to genera provides in dot form all the key features needed to help distinguish each genus. Again, there are excellent photographs, of selected members of each genus, by a number of well-known herpetologists. These are shown on each page alongside the text.

The easy to follow field guide, which covers all 102 currently known Australian dragon species, initially describes each genus, with accounts of individual species on following pages. The description, key characters, distribution, ecology and biology are shown on the left-hand page for each dragon. The snout to vent length (SVL) is clearly shown at the beginning of the description. A high quality photograph and clear distribution map is on the opposite page. There appears to be no mention of the source of the data shown on these maps, although it is probably 'Atlas of Living Australia'. This page also shows the size of each species compared to a human hand (average size hand, I assume), a very useful guide especially for inexperienced reptile enthusiasts. Whilst other reptile reference books clearly show the SVL for each species, the idea of showing the size of an animal compared to some common object, like a human hand, is a good one. Dichotomous keys are not included; nevertheless each dragon is described sufficiently to allow the reader to identify it to species level.

Dragon Lizards of Australia is a very worthy addition to the reference book collection of anyone interested in this wonderful group of Australian reptiles.

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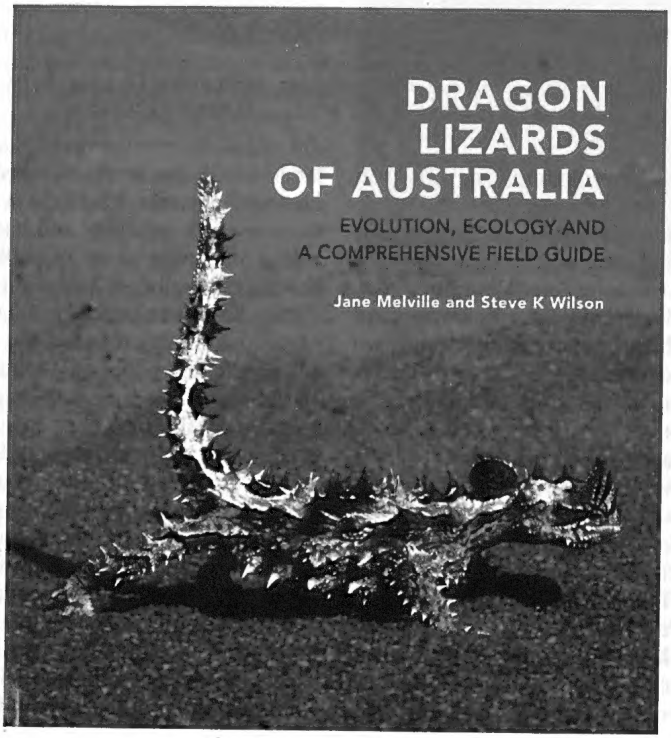

Fifty Years Ago

Who'll spread Nature's word now?

by John Larkin

Once, about 70 years ago, there was an old train which ran through Bacchus Marsh. The line was supposed to run around the top of a gorge. No phone calls please.

Anyway, the engine driver was a man who was something of a naturalist. He loved flowers and insects and other little things that grew.

Every time the train passed through the area, the driver would slow down to crawling speed and hop out. This would enable him to walk along beside the engine and study the wildlife.

One day, the guard, curious about the driver's behavior, also hopped out of the train and took a look. He, too, became involved in what he began to see round him.

Then, lastly, the fireman could stand it no longer. He, too, climbed out and walked alongside the train, studying the natural things round him.

One day, when all three men were outside, the train gathered up a little too much speed. It was just about away when they leaped up from their wildflowers, scrambled aboard and brought her back under control.

In these snap-snap days, there may be those who consider such people as naturalists to be freaks, people who wander round off the track of real life, who dawdle and dream beside a wildflower or a male gum emperor moth, or a tektite from outer space, who get lost among things that do not matter, to such an extent they just about lose the train.

Now maybe there can be sometimes something of the lotus-eater inside such students of nature, and so what if there is? Who is to deny they are also hard-working people?

There is, also a member of the Field Naturalists Club of Victoria, who sits in her Malvern apartment surrounded by aquariums, a lady paralysed by arthritis, who is in iron from her neck down.

The lady, a doctor in biology and formerly a CSIRO worker, is studying mussels. Every now and again a three-page article by her appears in the **Victorian Naturalist**.

These people, these naturalists with their tiny findings, their snippets of apparent trivia, are about unknown to society and perhaps what they are doing is considered next to useless.

But at some particular moment in the future—who can say when—what they are doing, individually and collectively, will become important. It will be a piece to help complete the gigantic jigsaw of nature.

The **Victorian Year Book, 1962,** said: of the **Victorian Naturalist:**

"More than 200 new species of plants have now been published in this journal which has served as a most useful medium for disseminating botanical information."

The journal's usefulness as a source of reference since the end of the last century can be understood by the fact that the publication is sent each month to 160 Government departments, as well as many overseas readers.

The magazine is published monthly by the society, which has about a 1000 members. The 1200 copies per issue cost the society about $350–$400. The only income, apart from a couple of tiny advertisements, is a grant from the Ingram Trust every time an article is published mentioning a mammal or bird. This amounts to about $1000 a year.

Many stories could be written about this gentle, valuable publication, which carries an index to all sorts of information.

The most important is that increased publishing costs and higher postal rates, twice in two years, have just about knocked it for a loop. The PMG argues that it is a "social" and not a "scientific" magazine and being the Post Office, that is that.

It might well be that. The society is right up against the wall and the magazine could have to be scrapped.

For all the Government talk about pollution—of the land and the mind—what about a grant for the **Victorian Naturalist** which has been writing about our environment since 1884, long before most people had even heard of the word, let alone how to use it, let alone what it truly means.

From *The Age*, p. 2, October 20, 1970

Published with permission: John Larkin/*The Age*.